

Docket No.: 289246USOPCT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

GROUP: 1621

Klumpe et al.

SERIAL NO: 5,75,760

EXAMINER: Keys, R.

FILED: April 13, 2006

FOR: C10-Alkanol alkoxylate mixtures and their use - novel low-foam wetting agents

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for patents
Alexandria, Virginia, 22313

Sir:

Now comes Markus Klumpe who deposes and states that:

1. I am familiar with the prosecution history of the above-identified application.
2. I have read and understood the Ruland (WO 03/091190 A1), Dahlgren (WO 94/11330), Dahlgren (WO 94/11331) and Clement (WO 01/04183 A1) patents cited by the Examiner during the prosecution of the present application.
3. I am a graduate of university of Bonn and received my diploma degree in the year 1995.
4. I have been employed by BASF Aktiengesellschaft since 1999 and I have been conducting research in the field of alkoxylation for 5 1/2 years.

5. In order to demonstrate that the particular mixture of isomeric alkoxyates of the present claims has properties that are different from other alkoxyate mixtures, the following experiments were carried out by me or under my direct supervision and control.

6. Preparation Example 1: Synthesis of Ethoxylates of 2-Propylheptanol by Means of KOH Catalysis

2-Propylheptanol and KOH (finely powdered) were mixed and dehydrated at 80°C and 40 mbar for 1 hour. The reaction product was introduced into an autoclave, the autoclave was rendered inert twice with nitrogen and then heated to 120°C. Over the course of 15 minutes, ethylene oxide was metered into at a maximum pressure of 1 bar. The system was maintained for 5 minutes at this pressure, then the pressure was increased to 3 bar by adding ethylene oxide over the course of 60 minutes, the system was held at this pressure for 5 hours, and finally the pressure was increased to 6 bar. During the last metered addition, ethylene oxide was added only until the desired amount of ethylene oxide was reached. The pressure was then maintained at 6 bar through the metered addition of nitrogen. After a reaction time of a further 10 hours, the system was left to cool to 80°C, and the reaction product was discharged. Volatile components were removed on a rotary evaporator at 30 mbar and 80°C.

7. Example 2 (2-Propylheptanol + 3 EO, KOH Catalyzed)

The synthesis was carried out analogously to preparation Example 1. 2.474 g of 2-propylheptanol (3.0 mol), 397 g of ethylene oxide (9.0 mol) and 1.8 of KOH were used,

a) The starting alcohol used was pure 2-PH, prepared by distillation of the technical-grade mixture with a purity greater than 99%. The product has the following properties:

Wetting on textile surfaces (EN 1772):	13 sec (23 °C, 1 g/l in 2 g of soda/l)
Foaming ability (EN12728):	about 20 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 26.8 mN/m (1 g/l; 23°C)
Degree of ethoxylation acc. to. OH number:	3.1 mol of EO

b) The starting alcohol used was 2-propylheptanol, technical-grade quality with about 90% of 2-PH and about 10% of 4-methyl-2-propylhexanol. The product has the following properties:

Wetting on textile surfaces (EN 1772):	12 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN 12728):	about 20 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 27.2 mN/m (1 g/l; 23°C)
Degree of ethoxylation acc. to OH number: 2.8 mol of EO	

8. Example 3 (2-Propylheptanol + 5 EO, KOH Catalyzed)

The synthesis was carried out analogously to preparation Example 2. 474 g of 2-propylheptanol (3.0 mol), 661 g of ethylene oxide (15.0 mol) and 2.3 g of KOH were used.

a) The starting alcohol used was pure 2-PH, prepared by distillation of the technical-grade mixture with a purity greater than 99%. The product has the following properties:

Wetting on textile surfaces (EN 1772):	10 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN 12728):	25 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 27.1 mN/m (1 g/l; 23°C)
Degree of ethoxylation acc. to OH number: 5.2 mol of EO	

b) The starting alcohol used was 2-propylheptanol, technical-grade quality with about 90% of 2-Ph and about 10% of 4-methyl-2-propylhexanol. The product has the following properties:

Wetting on textile surfaces (EN 1772):	9 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN12728):	30 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 26.3 mN/m (1 g/l; 23 °C)
Degree of ethoxylation acc. to OH number: 4.6 mol of EO	

9. Example 4 (2-Propylheptanol + 7 EO, KOH Catalyzed)

The synthesis was carried out analogously to preparation Example 2. 2.474 g of 2-propylheptanol (3,0 mol), 925 g of ethylene oxide (21.0 mol) and 2.8 g of KOH were used.

a) The starting alcohol used was pure 2-PH, prepared by distillation of the technical-grade mixture with a purity greater than 99%. The product has the following properties;

Wetting on textile surfaces(EN1772):	14 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN 12728):	330 ml (40QC; 2 g/l; 1,8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 27.8 mN/m (1 g/l; 23 °C)
Degree of ethoxylation acc. to OH number:	7.4 mol of EO

b) The starting alcohol used was 2-propylheptanol, technical-grade quality with about 90% of 2-PH and about 10% of 4-methyl-2-propylhexanol. The product has the following properties:

Wetting on textile surfaces (EN1772):	13 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN 12728):	350 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 27.1 mN/m (1 g/l; 23 °C)
Degree of ethoxylation acc. to OH number:	7.1 mol of EO

10. Example 5 (2-Propylheptanol * 10 EO, KOH Catalyzed)

The synthesis was carried out analogously to preparation Example 2. 474 g of 2-propylheptanol (3.0 mol), 1322 g of ethylene oxide (30.0 mol) and 3.6 g KOH were used.

a) The starting alcohol used was pure 2-PH, prepared by distillation of the technical grade mixture with a purity greater than 99%. The product has the following properties:

Wetting on textile surfaces (EN 1772):	47 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN 12728):	380 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	30.5 mN/m (1 g/l ; 23 °C)
Degree of ethoxylation acc. to OH number:	10.4 mol of EO

b) The starting alcohol used was 2-propylheptanol, technical-grade quality with about 90% of 2-PH and about 10% of 4-methyl-2-propylhexanol. The product has the following properties:

Wetting on textile surfaces (EN 1772):	40 sec (23°C, 1 g/l in 2 g of soda/l)
Foaming ability (EN12728):	370 ml (40°C; 2 g/l; 1.8 mmol) of Ca ²⁺ ions, after 30 sec)
Surface tension (DIN 53914):	about 30.7 mN/m (1 g/l; 23°C)
Degree of ethoxylation acc. to OH number:	10.2 mol of EO

11. The physicochemical properties and tests for foaming and surface tension are thus comparable irrespective of whether the preparation was carried out using a technical grade or isomerically pure grade.

12. Each of the above examples provides two different alkoxylate compositions. One of the compositions, i.e., Examples 4a, 5a, 6a, and 7a do not meet the requirements of the invention because they are made from essentially pure 2-propylheptanol obtained by distillation. In comparison, Examples 4b, 5b, 6b and 7b are made from a mixture of 2-propylheptanol and 4-methyl-2-propylhexanol, according to the isomeric mixtures as claimed in claim 1 of the present application.

13. Although the corresponding inventive and non-inventive compositions exhibit approximately the same foaming and surface tension characteristics, the wetting performance for the inventive examples is different than the wetting performance of the non-inventive examples. It is my opinion that it could not be foreseen that different wetting performance would be obtained, especially on view of the fact that other performance characteristics are not different (e.g. foaming and surface tension) and there is no reason to believe in the absence of the experimental results shown above that the wetting performance would change in any degree that is different than the foaming and surface tension performance.

14. Although the present examples relate to alkoxylates having only one block of ethyleneoxide in contrast to alkoxylates according to claim 1 of the present invention having three or four blocks of ethyleneoxide or propyleneoxide, the experimental results according to this Declaration can be transferred to alkoxylates according to claim 1 of the present invention. Alkoxylates according to claim 1 of the present invention based on the specific isomeric mixtures, will also show an improved wetting behaviour and comparable foaming ability and surface tension compared to alkoxylates having the same alkoxylate block structure, but being based on pure 2-PH.

15. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

16. Further deponent saith not.

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28. September 2007
Date